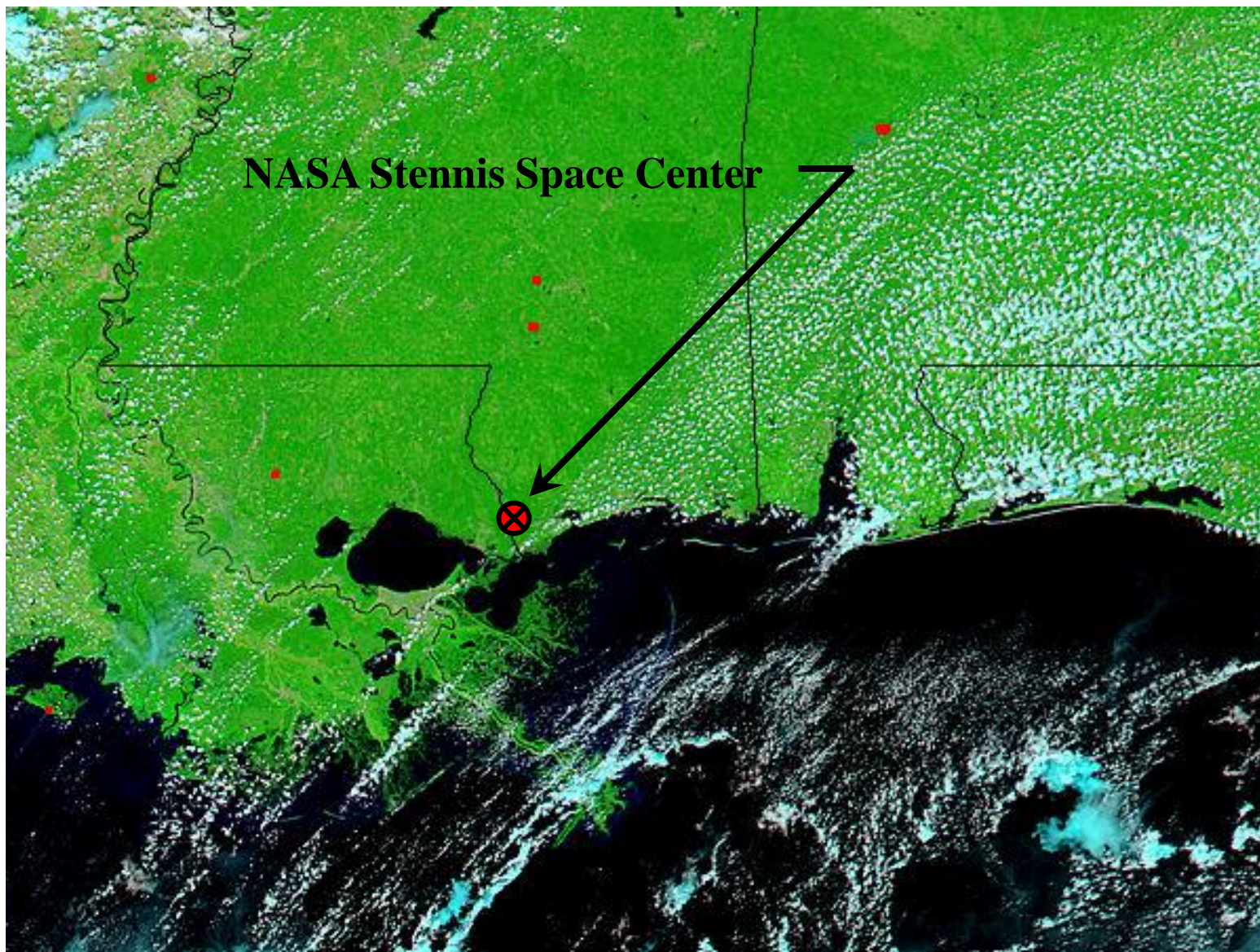


Case Study and Lessons Learned Associated with Hurricane Katrina August 29, 2005

**Ron Magee
May 11, 2011**

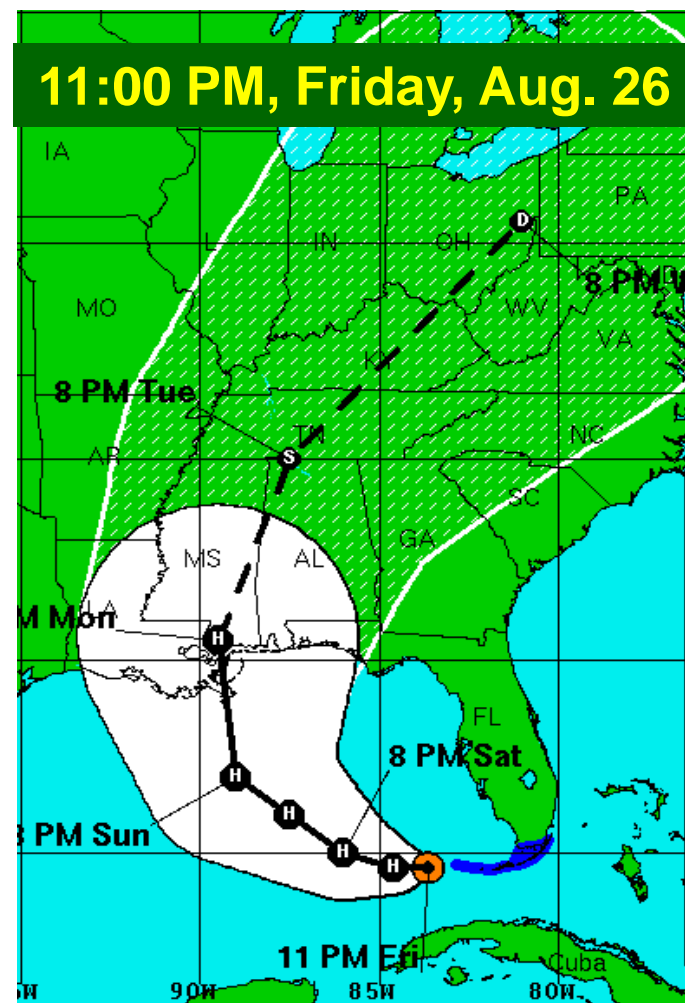
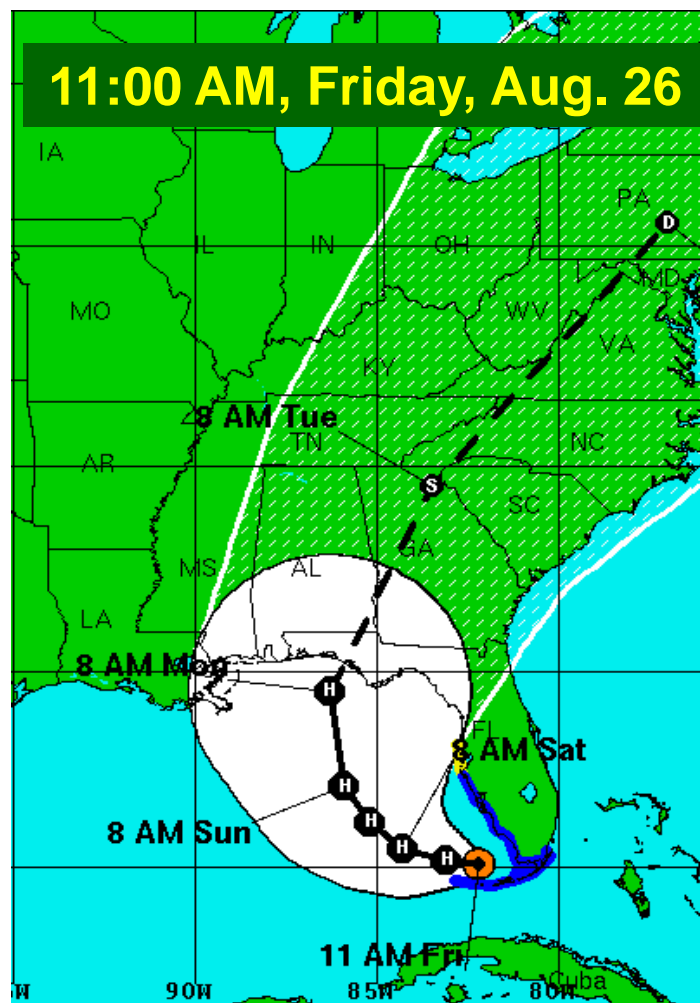


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Projected Path of Hurricane Katrina



Landfall August 29, 2005

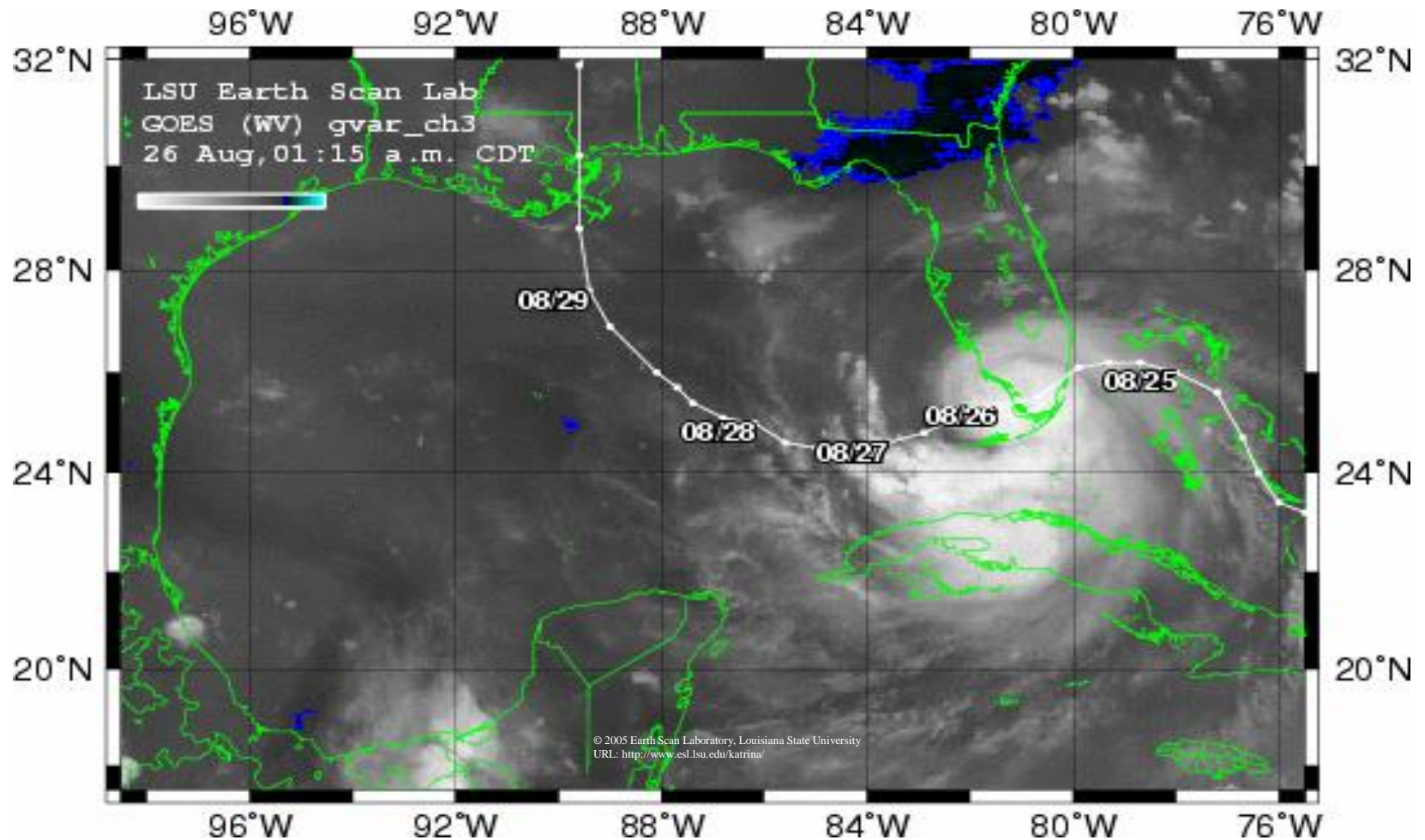
Wind speed 170 mph

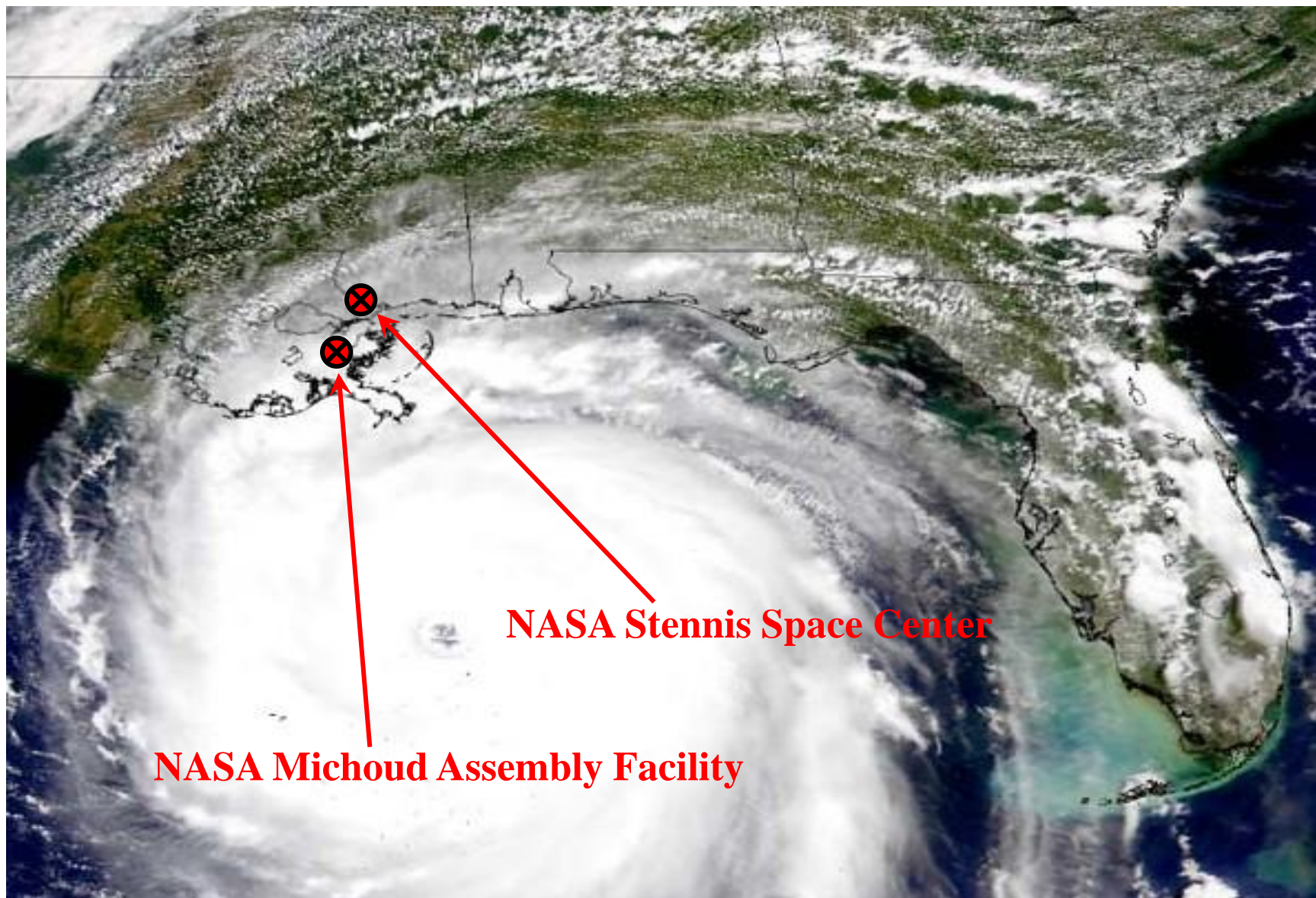
Eye passing over SSC at 9:45 a.m.



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GOES Satellite Track of Hurricane Katrina





The Impact



NASA Stennis Space Center



Bldg. 1100



Main Roadways



NASA Stennis Space Center



Bldg. 1100
Main Administration Area

SSME/RS-68 Facility
Bldg. 9101



Employee Impact

- One person suffered a broken arm on site
- Approximately 25% of Stennis employees had uninhabitable homes or no homes at all
 - Approximately 2500 employees and family members sheltered at Stennis
 - Approximately 1200 citizens, with no work connection to Stennis, were granted shelter
- All employees were affected with wind damage to homes, fallen trees, and had general debris clean-up
- Personnel were also mobilized into Stennis from all over the country for many weeks away from their homes and normal places of work



I-10 Bridge from New Orleans to Slidell, LA



Bridge Over the Bay of St. Louis



Bay St. Louis, Mississippi



Bridge over the
Bay of St. Louis

Impact was on the coast as
well as miles inland



Beach Front, Downtown Bay St. Louis





Downtown Beach Blvd

Day After Katrina



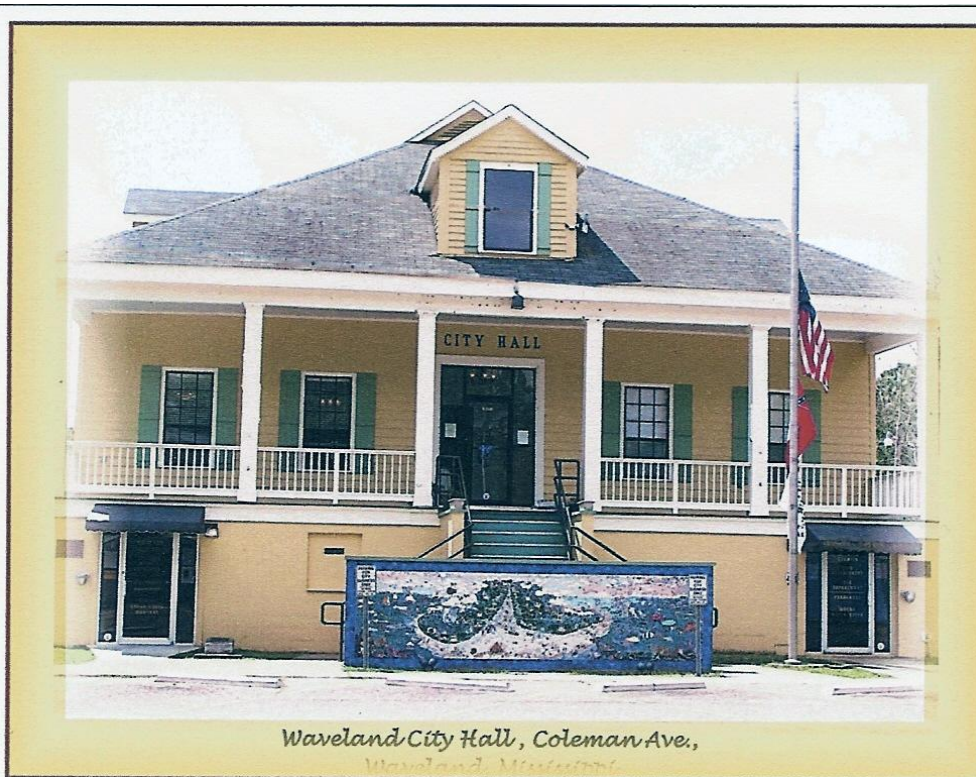
Three Years Later



John C. Stennis Space Center

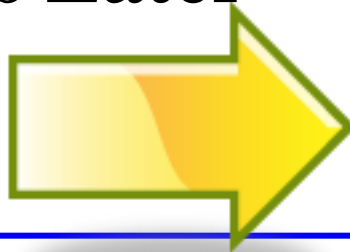
Waveland City Hall

Before Katrina



*Waveland City Hall, Coleman Ave.,
Waveland, Mississippi*

Three Years Later



Waveland City Hall--Katrina Damage



John C. Stennis Space Center

Many Home Sites Looked Just Like This



Center Closure & Reopening Process Post-Katrina



Our Closure Process

- Closure normally occurs in Hurricane Condition II where hurricane winds are expected within 24 hours
 - Implementation of contra-flow traffic from the New Orleans area can affect this decision
 - Coordination with the Emergency Council (consisting of the other agencies on site) is used as a communication tool
- NASA Headquarters is notified as to our plans and communication frequency is established
- After closure, only Emergency Response Personnel are allowed through the gates
- In addition to NASA functions, several critical functions of the U.S. Navy, the Department of Energy, and the Department of Homeland Security are also readied for storm impact



Our Sheltering Process

- At Hurricane Condition I (where hurricane winds are expected within 12 hours)
 - Employees are encouraged to seek other shelter in all communications leading up to a storm
 - If they should seek shelter, badged employees are allowed to re-enter the Center with sponsored family members to shelter in their offices or designated areas
 - The public is allowed to shelter as a last resort in areas managed by the American Red Cross if a formal request is submitted by the county EMA Director
 - No food or medical facilities are provisioned



Following the Storm

- After the storm, actions are implemented to restore the facility to normal operations
 - Employees are notified via our new Emergency Notification System
 - Employees, their families, and the public that sheltered at Stennis either:
 - Go home following the storm
 - Move to American Red Cross shelters north of Stennis within 4 to 8 hours
 - An initial damage assessment is completed



Reopening of the Center

- Any damages affecting occupancy or personnel safety are addressed
- A decision is made to re-open the Center
- Lesson Learned: If the community is widely affected, as was the case with Hurricane Katrina, re-opening is delayed at the discretion of the Center Director
 - Mandatory evacuations in surrounding areas could disperse employees beyond their ability to return the next day
- Center status is updated on the emergency call in number and local media are notified that Stennis Space Center is open for business
- The Emergency Notification System will also be communicating with personnel to ascertain their personal circumstances and their ability to return to work or work from home.



Incident Command System

- The rapid expansion of activities at Stennis following Katrina pointed to the need for the Incident Command System (ICS)
 - System was in place for small incidents
 - Much of the response and recovery actions were developed as the event unfolded
 - Lessons Learned: Emergency Response Officials are now clearly identified, trained at various levels of ICS, and follow the ICS in every emergency scenario
- Two lessons learned that worked well during Hurricane Gustav and Ike:
 - HQ EOC staffing a telecon with all Centers to ascertain needs from the Center being affected and to determine who can meet those needs
 - MAF staging recovery personnel at Stennis



Center Recovery Process



Under Normal Circumstances

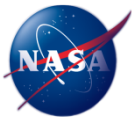
- Once the Center is deemed safe for return to work, the Center is re-opened
- Work continues on longer-term damage mitigation
- Employee Assistance Program activities are made available to assist individual employees with their recovery concerns



It was a Different Story After Katrina



**3,000 Meals Served
3 Times a Day**



People Had To Be Located



Employee Call Center



Lessons Learned on Employee Accountability

- We needed a uniform way to contact our employees and we now have that with the Emergency Notification System currently near completion and final deployment.
- NASA employees must update the Emergency Contact Information System each year with local and out of area contact information
- A Telecommuting Plan has been established to allow for working offsite or at another NASA Center as work allows



Federal Government Needed Stennis Space Center As a Base for Its Response to Community

- FEMA/MEMA were the lead agencies
- All operated under a Unified Command
- Primary responders:
 - The Mississippi Emergency Management Agency (MEMA)
 - Florida Division of Forestry IMT
 - USDA Forest Service California IMT3
 - Military



California Incident Management Team (CIMT3) Assigned Tasks

- Received MREs, water, and ice into Stennis Space Center and Stennis International Airport and distributed to a 6-county area
- Warehoused and distributed other commodities such as baby food, diapers, tarps, etc.
- Created base camps to support emergency workers, military, and truckers



Stennis International Airport

Thru Day 15 --

**Over 100 Missions and
187 Helicopter Manifests**



**Received and distributed
water, ice, and MREs
Medical Evacuation**



John C. Stennis Space Center

Thru Day 15 -- Distributed:

- 3.9 Million Gallons of Water



- 27.8 Million Pounds of Ice



- 2.4 Million MREs



**Trucks carrying hurricane
relief supplies await
distribution instructions**





**Thru Day 15 --
More than 1,850 Truckloads of
Supplies Distributed from Stennis
Space Center to 6-County Area
of Mississippi.**



Re-establishment of Workforce

(Lessons Learned)

- After Hurricane Katrina, Stennis implemented several initiatives to help re-establish its workforce:
 - A Day School Program for children was established to allow parents to return to work while local schools were closed
 - Temporary housing was secured for employees and their families through a special housing office staffed by NASA and other agencies
 - Employee Assistance Program efforts were ramped up to address a wide assortment of issues that arose among the employee population
 - The Stennis Helping Stennis Program helped employees get their homes restored



Communications (Lessons Learned)

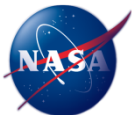
- During and after Katrina:
 - Center was totally dependent on voice land lines, many of which went underwater
 - Center lost internet connectivity
- Today the Center has:
 - A northbound buried communication line
 - A portable satellite internet and communications system
 - Four satellite phones
 - We now have an Emergency Communications Center with ham radio/SHARES network capability which is tested on a frequent basis.



Power

(Lessons Learned)

- During and after Katrina:
 - Center lost its electrical power service as both feeds were from the south
 - High-pressure systems required priority attention to restore power to them to prevent serious damage
 - Fuel management was a big concern for weeks following Katrina
- Today the Center has:
 - A northbound 115 KV power transmission line is under contract
 - Generators will be pre-positioned at the beginning of hurricane season to reduce last minute activity
 - Fuel tanks are kept 90% full throughout the hurricane season



Procurement and Finance

(Lessons Learned)

- Office of Procurement keeps a kit that includes the following:
 - List of contractor POC's including type of service provided
 - Copy of Contracting Officer Warrants and a log book
 - Hard copy of a mini FAR and NASA FAR Supplement
 - Hard copy of purchase order forms, sample letter contracts, purchase requisitions outside SAP, etc.
 - Large limit purchase cards for COs funded before storm
- The Office of the Chief Financial Officer:
 - Establishes fund sources to track expenses
 - Uses the standard Agency process for handling payroll after a disaster



Data and Vital Records Protection (Lessons Learned)

- Data Center is backed-up monthly to an offsite location
 - We have a “fail over” of our critical applications
 - We now have a process of developing electronic copies of vital records
- COOP Facility houses critical information for recovery
 - Tech Doc System is replicated at site monthly
 - Electronic GIS and facility drawing information at site
- We now have a new Records Retention Facility built to withstand hurricane force winds.



New Emergency Operations Center

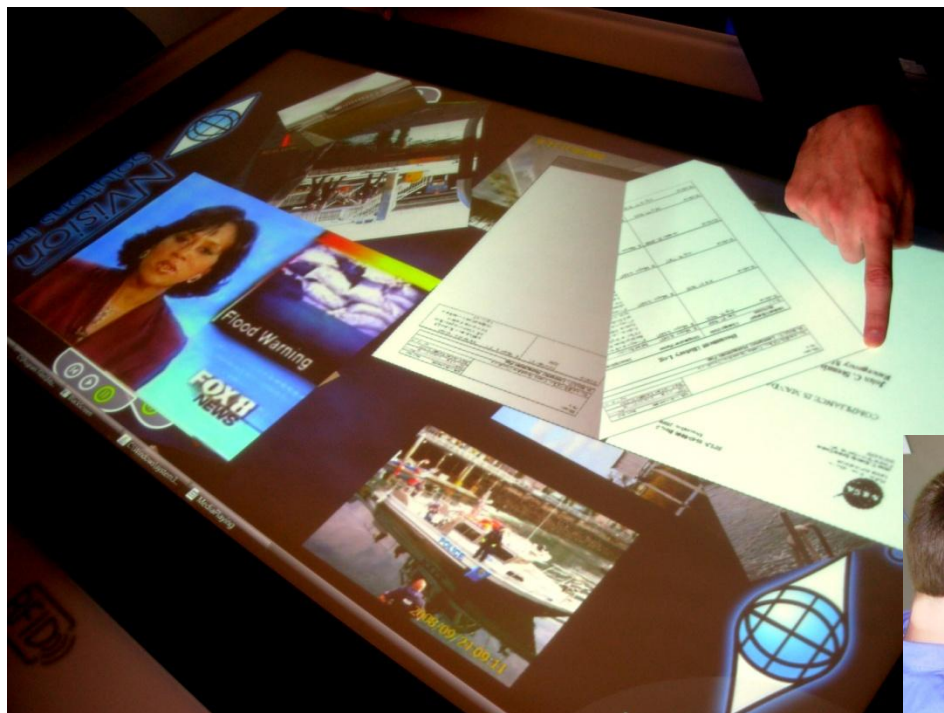
- Brings the Incident Command Post together with all Emergency Functions
- Contains an area for MAF recovery management



- Proximity of Security, Fire Protection, Medical, and EMCS provide for more successful coordination
- We now have 3 helicopter pads to service our emergencies and provide staging to MAF



EOC Capability Upgrades to Take Advantage of GIS Technology



**REACT Emergency Response
Management System using
Multi-Touch Surface Computer
(SBIR Phase III Project)**

**NASA Institutional GIS
Weather Information, Flood and
Toxic Plume Modeling and Area
Flood Gage Monitoring is available**



John C. Stennis Space Center



National Aeronautics and Space Administration

Wallops Flight Facility

Emergency Operations Center

NASA Incident Command System Planning Dashboard

ACTIVATION

POST-INCIDENT

WEB EOC

REACT

WIMMS

CODE MESSAGING

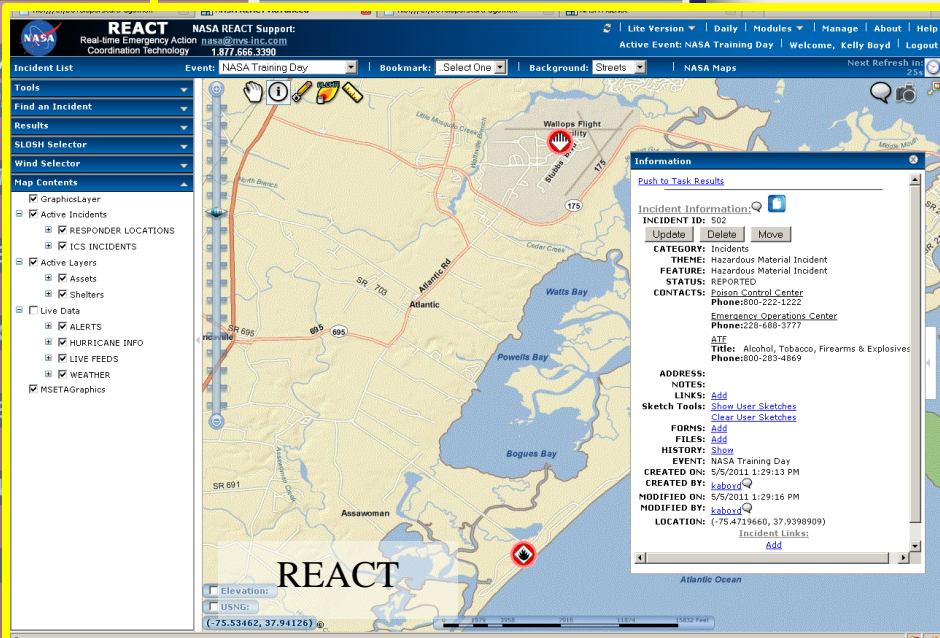
POST-EVENT IMAGERY

ON-SITE ANALYSIS

BASELINE IMAGES

NASA-Wide GIS

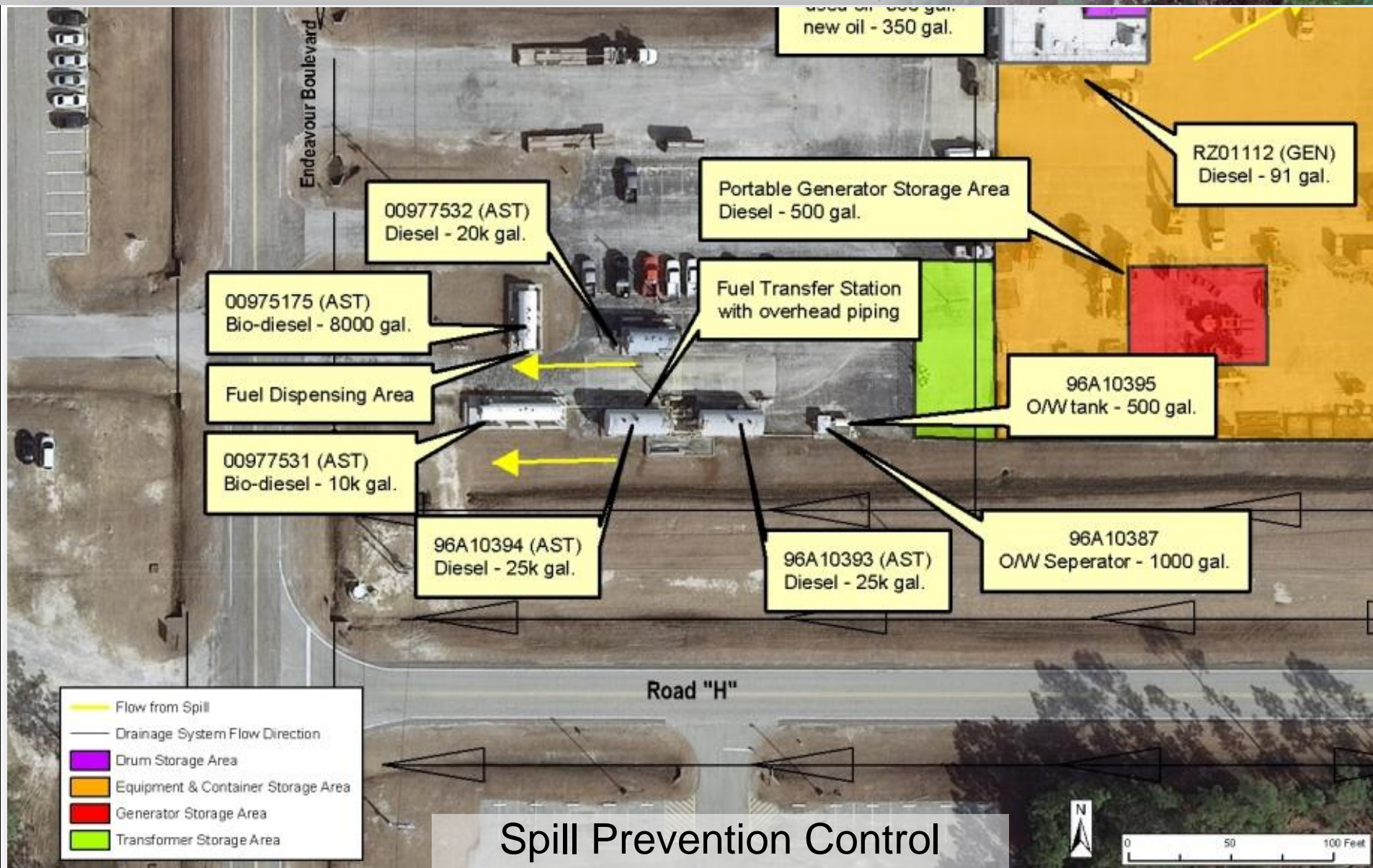
Pre-Created Storm Surge Maps



REACT



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Accessing the NASA-Wide GIS

To request access to or to
ask questions about the
NASA-Wide GIS, please
contact Kelly Boyd:

- Phone: 228-688-2603
- Kelly.A.Boyd@nasa.gov
- Visit the NASA-Wide
GIS Booth

Link to:

<https://sschqgis.ssc.nasa.gov/HQGIS>



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Summary

- We continue to modify our preparedness each year based on what we have learned from Hurricane Katrina and the subsequent storms that have come our way
- Hurricane Katrina repair funding has helped us repair damage, and mitigation funding has helped us better prepare for future storms, including the Emergency Operations Center, the Documentation Storage Facility, and Enhancement of our Back-up Generator System
- We want to thank all who have helped us along the way

